Collaborative Learning and Creative Writing

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Abstract

CSCL software tools must provide support for group work and should be based on a collaborative learning technique. The PBL based CCCuento tool is introduced here. It is intended to support apprentices groups in the collaborative creation of stories in order to improve language use and development of writing skills. The tool follows a model, which includes several positive interdependencies and is implemented as a sequence of individual activities followed by break periods. The break periods are used for reviewing and discussion. An experiment is reported in which several groups of high school students used the tool

1. Introduction

We have detected college students have many deficiencies for writing. These range from lack of skills to present coherent ideas to writing style difficulties. There are many studies on this problem, e.g., López [21] reports university graduates having documented writing weaknesses once they begin activities in the labor marketplace.

Writing is an open-ended design task. In a writing process there is no fixed goal, nor there are formal transitions between states. Also, writing is under-constrained. There are numerous texts that could fit a writer's goal and possible actions that a writer might take at any stage. Moreover, the writing task is recursive; writing brings new ideas which may lead the writer to revise goals and to embark on a new phase of planning and translation [15].

Faced with this situation, we considered a project to stimulate high-school students to improve their writing skills. Our project started with the idea that any support we would develop towards this end should be related to collaborative learning (CL). The advantages of CL are well documented in [4]. However, CL is not easy to induce and support. Individual learning does not occur because a person does it alone, but because she performs activities (e.g. reading) involving some learning mechanisms (induction, prediction, compilation, etc.). Similarly, two students do not magically learn together because we have two people, but because they do specific learning mechanisms. They include individually executed activities as well as interaction between them. The interactions include agreed rules, explanations, etc. As Dillenbourg mentions, in CL environments particular forms of interactions are needed to trigger the desired learning mechanisms [10]. There is, however, no guarantee that those interactions will occur. Hence, the idea is to develop mechanisms to increase the probability they will happen. One of them is by designing well-specified collaborative scenarios. It is necessary therefore, to design the learning task and the learning environment. We will focus on one task, perhaps very difficult: creative writing.

CL involves the student and leads to increased student responsibility for her own learning. Additionally, CL provides a social basis for learning including peer interactions which are acknowledged as one of the most significant factors in a successful college learning experience [11]. The CL group also allows individuals to observe perspectives of other group members thus expanding each one's own perspective [19]. As individuals in the group observe other's thinking and reasoning processes, opportunities to reflect upon their own thinking are presented. This process contributes to the development of higher-order thinking skills and advances in metacognition of students [2]. Other CL experiences such as debate, argument, negotiation, discussion, compromise, and dialectic are valuable in developing reflective skills, social skills, and higher-order thinking skills [18].

Our project then incorporated collaborative learning support from the beginning. What is reported here is the development of a tool with this perspective. The whole project is under way and thus, the reported results are initial, tentative experiences.

This paper presents a collaborative scenario in Section 2. Section 3 describes a computational tool based on the proposed model. Section 4 presents a experiment in which high school students used the tool during several months. The conclusions and further work are discussed in Section 5.

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2. Collaborative Scenario

Instead of designing systems that compensate for metacognitive deficiencies by becoming increasingly directive, we should develop systems that support the learner's metacognitive activities (or even better, that develop their metacognitive skills) [8]. Hewitt et al. state that a computer-supported learning environment can serve not only as an on-line conferencing facility but also as a true learning environment if it enables participants to represent a problem from multiple perspectives, to build knowledge communally, and to examine knowledge and refine design elements at different levels of abstraction [13]. Our scenario takes into account several factors. It should be based in a known CL technique. It should also include mechanisms to create positive interdependencies. Finally, it must include clear roles and responsibilities and there should be a shared objective among all group members.

The tool we developed is intended for this scenario. It is called *CCCuento* (Collaborative Construction of Tales, in Spanish). A group of four apprentices must develop four stories during a period of two or three months using the tool. CCCuento is Web-based, supporting asynchronous distributed work. However, not all group work is done in this fashion, since group members may have synchronous face-to-face meetings (the tool does not support these meetings, just the stories development).

2.1. Collaborative Learning Techniques

The concept of collaborative learning, the grouping and pairing of students for the purpose of achieving an academic goal, has been widely researched and advocated throughout the professional literature. The term "collaborative learning" refers to an instruction method in which students at various performance levels work together in small groups toward a common goal. The students are responsible for one another's learning as well as their own. Thus, the success of one student helps other students to be successful. It describes a situation in which particular forms of interaction among people are expected to occur, which would trigger learning mechanisms, but there is no guarantee that the expected interactions will actually occur [10]. Proponents of collaborative learning claim that the active exchange of ideas within small groups not only increases interest among the participants but also promotes critical thinking. According to Johnson and Johnson, there is persuasive evidence that cooperative teams achieve at higher levels of thought and retain information longer than students who work quietly as individuals. The shared learning gives students an opportunity to engage in discussion, take responsibility for their own learning, and thus become critical thinkers [23].

Successful implementation of a Collaborative Learning (CL) strategy is much like planning for a journey. The more people are talked to and the more background research is done about the journey, the more successful it will be. Teachers who want to start using CL techniques should observe a teacher or teachers who are experienced and proficient in the use of CL techniques. Obtaining training prior to introducing CL into the classroom is mandatory. Preparation for classes using CL is the key to success. In order to help students begin the process of working collaboratively, it is necessary to provide activities that will foster a cooperative environment and encourage students to get to know each other from different perspectives. Keeping a record of what works and why as the teacher develops CL techniques is desirable. As the CL process is begun, teachers can form support groups with other teachers in departmental areas or across curricula. Because CL is relatively new to many institutions, teachers must work with their supervisors to make sure they are aware of the techniques as well as reasons for using them [23].

There are several reasons why CL works as well as it does. The idea that students learn more by doing something active than by simply watching and listening has long been known to both cognitive psychologists and effective teachers [3], and CL is by its nature an active method. Beyond that, cooperation enhances learning in several ways. Weak students working individually are likely to give up when they get stuck; working cooperatively, they keep going. Strong students faced with the task of explaining and clarifying material to weaker students often find gaps in their own understanding and fill them in. Students working alone may tend to delay completing assignments or skip them altogether, but when they know that others are counting on them, they are often driven to do the work in a timely manner. Students working competitively have incentives not to help one another; working cooperatively, they are rewarded for helping. A collaborative scenario must be based on a CL technique. There are several of them. Some of the best-known techniques are JIGSAW [1], TAPPS [9], STAD [12] and Learning Together [17].

CCCuento, besides being constructivist, is based on a technique known as PBL (Problem-based Learning). PBL is a collaborative instructional method helping stu-dents to develop metacognitive abilities, i.e., "learning to learn". PBL intends to moti-vate students to collaboratively find the solution to a given problem. Problems are used to stimulate students' curiosity and to initiate learning on a certain subject.

PBL attempts to break this focus by engaging students in structuring solutions to real life, relevant, contextualized problems. By replacing lectures with discussion forums, faculty mentoring, and collaborative research, students become actively engaged in meaningful

learning. There are many studies about how PBL can be facilitated by technology [20].

PBL as applied to our story building case is described in this paper. The motivation in this case is to challenge students to write interesting stories. The teacher does not "instruct" students on how to write the story. The students must find out how to do it. Obviously, this is simplified by the fact the tools has a tutorial on story writing techniques, including reference material, ample bibliography and links to related Internet sites. At the end of the activity, the apprentices not only have developed the stories (objects building) but also have learnt to create stories (knowledge building). Students thus prepare themselves to critically and analytically think and learn to find the appropriate resources for their own personal growing.

2.2. Positive Interdependencies

Positive interdependencies (PIs) are mutual obligations that contribute to a common goal. The PI is a central element in CL, since it fosters group work in connection with its organization and functioning [14]. Johnson et al. [16] have listed several types of PI, some of which are embedded in CCCuento. PIs are described below.

"Goal interdependency" is achieved when groups have clearly defined goals; apprentices must be aware that no member of the group can achieve success unless all the other members also do it. "Identity interdependency" occurs when a group identifies itself with a name, motto, flag or another symbol. This interdependency brings unity to the group.

The group will have "task interdependency" if each member of the group is aware that all assigned individual tasks must be completed in the best possible way. If all participants receive a common award, then the group has an "award interdependency".

CCCuento incorporates PIs by organizing the story writing task in five phases: (1) naming the story, (2) introduction, (3) body A, (4) body B, and (5) final sequence. Each participant must work in each and all phases, although she develops a different part in every story (as mentioned before, there are four stories being built). Figure 1 shows the work organization. At the end of the activity, the teacher evaluates and grades the group work (award interdependency). Since a story is effectively written by all participants, there is task interdependency. At the end of story writing, the group discusses the name of each story and decides it by consensus; this is goal interdependency. Before actually writing, the group gives itself a name (identity inter-dependency); every apprentice also chooses an alias to be used during the activity.

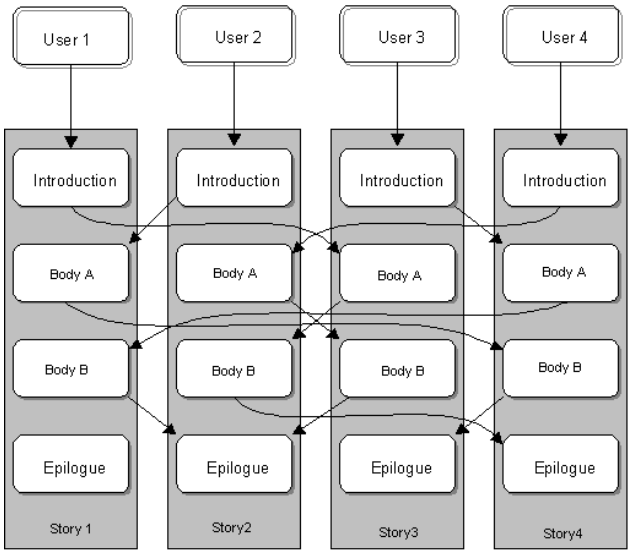

Figure 1. Story structure and work distribution

2.3. Individual Responsibilities and Shared Objectives

Group work includes individual tasks. They must be well coordinated and completed to achieve success. Moreover, the group must have clear objectives and each person must have a clearly specified role for the group success [17]. Each apprentice using CCCuento is responsible to finish one part of a story during each phase. They must be aware the story will not be good if any of the parts is incomplete or defective.

Any group activity must try to distribute the workload as equally as possible among group members. As mentioned by Dillenbourg, one requirement to label a situation as *collaborative* is to have action, knowledge and status *symmetry* [10]. Each student using CCCuento must write approximately one fourth of the stories (Fig. 1).

Shared objectives are needed in a collaborative activity. As Dillenbourg mentions, these shared objectives can only be defined through a continuous interaction among group participants [10].

They must discuss until explicit agreements are reached and sometimes this implies a complete re-structuring of the activity. Collazos et al. have defined a set of indicators to evaluate the collaboration process in a group activity [6]. One of these is the success criteria. The result of this indicator is obtained after an analysis of the performed activities with the goal to re-structure the group activity. Furthermore, the larger is the shared knowledge on a particular problem the greater is the learning [7]. If a student is aware of her own learning and the learning of her classmates, she will be in a good

position to make strategic decisions. Dillenbourg et al. claim these strategic decisions are of the metacognitive type when are explicitly made and communicated to the rest of the group in order to reason over past or future actions. Such reasoning is needed to negotiate a consensus [8].

In CCuento, a scheme of "work breaks" has been introduced. Apprentices can reason about the activity development during these breaks. This discussion is intended to internalize and assimilate in an appropriate way what is being done. The scheme includes several work breaks, as summarized in Table 1.

Table 1. Phases and breaks using CCCuento

Phase 1	Write the introduction for all stories
Break 1	Group name is chosen
Phase 2	Interchange stories. Write first part of the body of each story
Break 2	Review and approve others' writings
Phase 3	Interchange stories. Write second part of the body of each story
Break 3	Review and approve others' writings
Phase 4	Interchange stories. Write epilogues
Break 4	Name the stories by consensus

According to Clarck & Schaefer, members of a group should make contributions to the solution of a given problem, and these contributions must be accepted by the rest of the group in order to have knowledge construction [5]. Therefore, with CCCuento, there must be an agreement at the end of each break. In fact, the tool allows to continue to the next phase only if the four apprentices explicitly approve the previous phase. However, the apprentices can edit and modify their own parts in the previous phases. This is provided to enable students to improve their contributions as a result of the reviews and discussions. After naming the stories (last phase), CCCuento disables the text edition option and thus, the teacher can know do her evaluation job.

3. User Interface

The initial screen is shown in Fig. 2. The left hand side of the screen includes a way to ask (asynchronous) questions to the teacher. There is also access to story writing reference material. The main part of the screen provides information on the comments and modifications to the four stories under development. The case shown in Fig. 2 has story 1 highlighted because the user is requested to work on this story now. The lower part of the screen has the discussion forum which is available for asynchronous communication within the group. Once a story is selected, there are two options: text creation, and text edition, which correspond to different views of the story. The text edition view lets see the other participants' comments. This view also allows to finish the task and thus conclude the phase (for this user).

Figure 2. CCCuento main screen

Whenever a group begins a new phase, a new forum is started (figure not showed). This forum is an asynchronous communication tool, allowing students to coordinate their progress towards the common goal. All students are supposed to be classmates, so it is assumed they have rich unsupported face-to-face discussions as well. As a complement, the forum allows discussion in context.

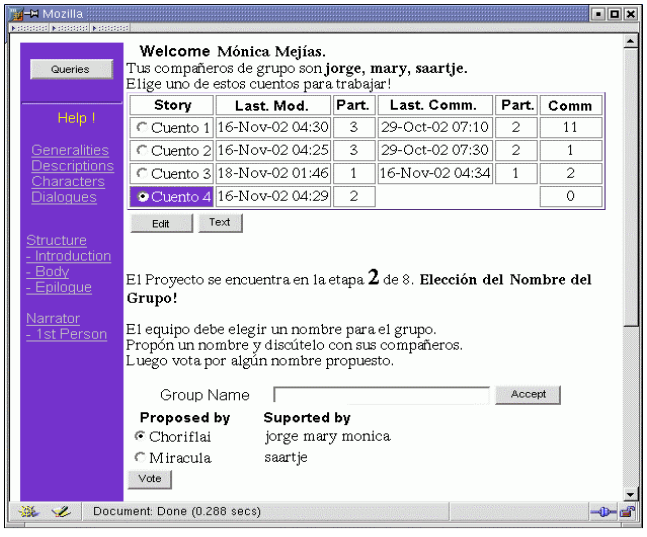

Figure 3. Choosing group name during break 1

Once the introduction of each story is finished, there is a first break. The group members must give a name to their group. Proposals are accepted and then voted; if there is no consensus, discussion and votes are again initiated until an agreement is reached. Figure 3 shows the user interface for the support of this process. Other breaks have similar supports. After the four stories are finished, CCCuento disables the text editing functionality. The stories can only be read now, and thus, the user interface changes (Fig. 4).

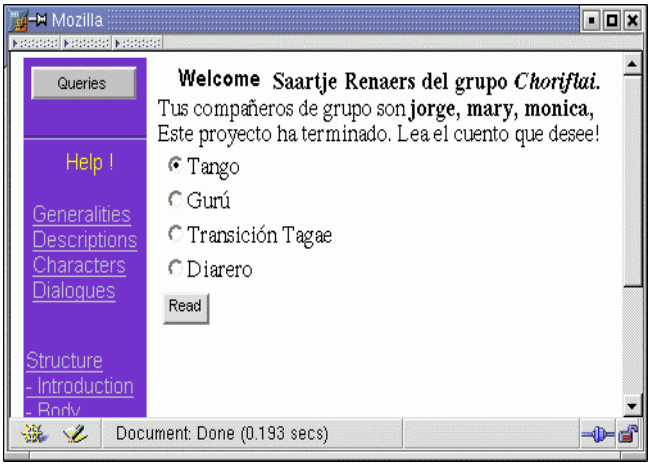

Figure 4. User interface to access written stories (translated into English; contents in Spanish)

When stories are finished, any person can read them because they are published in the Web (Fig. 5). There is no additional information on who wrote a specific part or any other special awareness.

Figure 5. User interface to access written stories (translated into English; contents in Spanish)

The teacher has a different access interface providing her access to all data generated during the work process. This data must be used only for monitoring, coaching and evaluation.

4. The Initial Experiment

CCCuento and its writing activities were used in a high school in our country. All students were 16 or 17 years old and were majoring in business. The groups consisted of students of both genders chosen at random, but every group had members belonging to the same class section. They were given general instructions, including the goal. The work schedule was mainly open, with a few compulsory sessions. These schedules sessions had an advisor available, but only for tool use and error detection.

The computer laboratory had Intel Pentium II and Intel 486 computers and thus all compulsory sessions were done in these machines. The network response was not fixed, but students did not complain about speed, because pages were loaded in little time. The tool was also tried with a home connection by using a 11.4 kbps modem; the response time was satisfactory. Response times were good because all communication is done through HTML documents (whitout images) generated with the PHP preprocessor, which connects to the MySQL database server.

The apprentices described the user interface as nice, clear and easy to understand. The work method of four stages and four breaks was only understood when they were developing the project (this was due to the very brief introduction to the tool). At the end, most subjects found the method was appropriate to work group, although they commented this meant they could only progress at a speed given by the slowest of the group, which was not always a positive feature.

With respect to teachers, they were unfamiliar with Internet use and thus they found they could eventually do much more than what they actually did. Nevertheless, they reported that the monitoring information supplied by the tool allowed them to check which groups worked more than other ones as well as the detailed statistics for each group member. They also reported that work proceeded at a faster pace than customary, due to peer pressure. Furthermore, the tool ensured work from all students, as compared to other kinds of assignments, in which "the slowest simply does not achieve anything". Concerning academic support, CCCuento was considered useful to support study programs on language use, developing writing skills.

5. Conclusions and Further Work

CL in classrooms requires carefully crafted environments – both technical and social. The design of a well-specified scenario could induce to collaborative activities within a group. This paper has presented a model that includes a set of elements that must be included in order to build scenarios promoting collaborative activities for a specific area, namely creative writing.

The initial experiment with CCCuento we have presented has shown the tool is useful to support group work, ensuring equal amount of work from each member and fostering several PIs. CCCuento incentives students to learn through creative writing and problem solving. The students learn from each other. They also learn to understand others' viewpoints and contributions and to unify individual task results.

Teachers valued the tool as well. They found it useful to assign a term project for the language use and communication area. They also liked the monitoring features. The quality of the literary works obtained with CCCuento is probably not good. This is because the tool is intended for learning, not for actual story authoring. Stories considered as products will likely lack coherence, uniform style and master plan when compared with the best individual works.

From a technical point of view, the tool can be used in schools with little resources. Old machines, any Web browser and relatively slow Internet connections can be used. Communication requirements are also very small, thanks to the sending of simple HTML pages. All processing is done at the server side, allowing seamless use despite future updates that eventually may be done on the tool. Future work is planned on further experimentation in various types of schools.

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